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L22	natural gas near3 tail gas	0	L22
L21	methane near3 tail gas	36	L21
L20	natural gas near3 tail gas	0	L20
L19	feed$3 near3 natural gas near3 tail gas	0	L19
L18	feed$3 with carbonaceous with tail gas	0	L18
L17	feed$3 near3 carbonaceous near4 tail gas	0	L17
L16	reacting near3 carbonaceous near4 tail gas	1	L16
L15	reacting carbonaceous near4 tail gas	0	L15
L14	reating natural gas near2 tail gas	0	L14
L13	reat$3 near1 hydrocarbon near2 tail gas	0	L13
L12	l11 not l10	19	L12
L11	react$3 near3 hydrocarbon$1 near5 tail gas	20	L11
L10	feed$3 near3 hydrocarbon$1 near5 tail gas	4	L10
L9	feed$3 near3 natural gas near5 tail gas	0	L9
L8	feed$3 near3 methane near5 tail gas	1	L8
L7	reacting near3 methane near5 tail gas	0	L7
L6	carbonaceous near4 tail gas	4	L6
L5	L4 and (fischer near1 tropsch or liquid near1 hydrocarbon$1)	15	L5
L4	L3 and (synthesis gas or carbon monoxide near1 hydrogen)	15	L4
L3	L2 or L1	18	L3
L2	separat$3 near4 carbon dioxide near5 tail gas	16	L2
L1	remov$3 near4 carbon dioxide near5 tail gas	4	L1

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FILE COVERS 1907 - 9 Jun 2003  VOL 138 ISS 24
FILE LAST UPDATED: 8 Jun 2003  (20030608/ED)

  This file contains CAS Registry Numbers for easy and accurate
  substance identification.


=> s natural gas (3a) tail gas
        573675 NATURAL
            27 NATURALS
        573691 NATURAL
                  (NATURAL OR NATURALS)
       1296255 GAS
        442870 GASES
       1458764 GAS
                  (GAS OR GASES)
         59948 NATURAL GAS
                  (NATURAL(W)GAS)
```

```
          52442 TAIL
          10041 TAILS
          59807 TAIL
                  (TAIL OR TAILS)
        1296255 GAS
         442870 GASES
        1458764 GAS
                  (GAS OR GASES)
           1337 TAIL GAS
                  (TAIL(W)GAS)
L1           21 NATURAL GAS (3A) TAIL GAS

=> s l1 and synthesis gas
        1062756 SYNTHESIS
              3 SYNTHESISES
          59038 SYNTHESES
        1096855 SYNTHESIS
                  (SYNTHESIS OR SYNTHESISES OR SYNTHESES)
        1296255 GAS
         442870 GASES
        1458764 GAS
                  (GAS OR GASES)
          13362 SYNTHESIS GAS
                  (SYNTHESIS(W)GAS)
L2            6 L1 AND SYNTHESIS GAS

=> s carbonaceous (5a) tail gas
          34325 CARBONACEOUS
          52442 TAIL
          10041 TAILS
          59807 TAIL
                  (TAIL OR TAILS)
        1296255 GAS
         442870 GASES
        1458764 GAS
                  (GAS OR GASES)
           1337 TAIL GAS
                  (TAIL(W)GAS)
L3            0 CARBONACEOUS (5A) TAIL GAS

=> s react? (3a) natural gas (3a) tail gas
        4171779 REACT?
         573675 NATURAL
             27 NATURALS
         573691 NATURAL
                  (NATURAL OR NATURALS)
        1296255 GAS
         442870 GASES
        1458764 GAS
                  (GAS OR GASES)
          59948 NATURAL GAS
                  (NATURAL(W)GAS)
          52442 TAIL
          10041 TAILS
          59807 TAIL
                  (TAIL OR TAILS)
        1296255 GAS
         442870 GASES
        1458764 GAS
                  (GAS OR GASES)
           1337 TAIL GAS
                  (TAIL(W)GAS)
```

```
L4            0 REACT? (3A) NATURAL GAS (3A) TAIL GAS

=> s feed? (3a) natural gas (3a) tail gas
        391568 FEED?
        573675 NATURAL
            27 NATURALS
        573691 NATURAL
                 (NATURAL OR NATURALS)
       1296255 GAS
        442870 GASES
       1458764 GAS
                 (GAS OR GASES)
         59948 NATURAL GAS
                 (NATURAL(W)GAS)
         52442 TAIL
         10041 TAILS
         59807 TAIL
                 (TAIL OR TAILS)
       1296255 GAS
        442870 GASES
       1458764 GAS
                 (GAS OR GASES)
          1337 TAIL GAS
                 (TAIL(W)GAS)
L5            1 FEED? (3A) NATURAL GAS (3A) TAIL GAS

=> d l5 ibib ab

L5   ANSWER 1 OF 1  CAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         1986:445818  CAPLUS
DOCUMENT NUMBER:          105:45818
TITLE:                    Removal of hydrogen sulfide from gases
INVENTOR(S):              Lynn, Scott
PATENT ASSIGNEE(S):       University of California, Berkeley, USA
SOURCE:                   PCT Int. Appl., 49 pp.
                          CODEN: PIXXD2
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:

     PATENT NO.        KIND  DATE           APPLICATION NO.  DATE
     ---------------   ----  --------       ---------------  --------
     WO 8602628         A1   19860509       WO 1985-US2179   19851101
         W:  JP
         RW: AT, BE, CH, DE, FR, GB, IT, LU, NL, SE
     EP 199815          A1   19861105       EP 1985-905972   19851101
         R:  AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE
     US 4976935         A    19901211       US 1988-210750   19880615
PRIORITY APPLN. INFO.:                   US 1984-657809      19841104
AB   A 2-stage process is described for the removal of H2S from gas mixts.  In
     the 1st stage, solns. of H2S (excess) and SO2 react to give S and water.
     The excess H2S is treated in a 2nd stage with a soln. of SO2, and any
     excess SO2 in the vapor phase is absorbed by the solvent.  The solvent
     used in both stages is selected to have a high solvating power for SO2, a
     lesser but substantial solvating power for H2S, and to promote the 2H2S +
     SO2 .fwdarw. 2H2O + 3S reaction, and may be a mixt., e.g., contg. glycol
     ethers (for solvation) and quinoline-type arom. compds. (for reaction
     promotion).  The process can be controlled by the selection of solvents
     and conditions (e.g., by the soly. of valuable minor components, such as
     C3H8); thus, it can be tailored for the treatment of varying feed
     gases (e.g., natural gas, synthesis gas, or
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tail gas from a Claus plant). The process also avoids the need to maintain exact stoichiometry of H2S and SO2. The app. for the process is described in detail with drawings.

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L1            21 S NATURAL GAS (3A) TAIL GAS
L2             6 S L1 AND SYNTHESIS GAS
L3             0 S CARBONACEOUS (5A) TAIL GAS
L4             0 S REACT? (3A) NATURAL GAS (3A) TAIL GAS
L5             1 S FEED? (3A) NATURAL GAS (3A) TAIL GAS

=> s l2 not l5
L6             5 L2 NOT L5

=> d l6 ibib ab 1-5

L6   ANSWER 1 OF 5  CAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         2003:82756  CAPLUS
DOCUMENT NUMBER:          138:305782
TITLE:                    Production of methanol
INVENTOR(S):              Pisarenko, V. N.; Abaskuliev, D. A.; Kosunov, O. A.
PATENT ASSIGNEE(S):       Russia
SOURCE:                   Russ., No pp. given
                          CODEN: RUXXE7
DOCUMENT TYPE:            Patent
LANGUAGE:                 Russian
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:

     PATENT NO.        KIND  DATE           APPLICATION NO.   DATE
     ---------------   ----  --------       ---------------   --------
     RU 2188790         C1   20020910       RU 2001-121977    20010807
PRIORITY APPLN. INFO.:                   RU 2001-121977      20010807
AB   The method includes stages of partial oxidn. of hydrocarbons, purifn. of
     synthesis gas, conversion of synthesis
     gas to MeOH in a series of reactors, and recovery of heat of tail
     gases in power and/or thermal plants. Partial oxidn. of gaseous
     hydrocarbons is conducted in an energy catalytic unit including a power
     machine and catalytic reactors at a mol ratio of O2 to gaseous
     hydrocarbons <0.6:1, a mol ratio of H2O(g) to gaseous hydrocarbons <0.7:1,
     and temp. in reaction zones of the catalytic reactors >700.degree..
     Synthesis of MeOH from synthesis gas contg. >30 vol.%
     N2 is conducted at cyclic changes of a raw material concn. in inlet flows
     of each of them. The MeOH synthesis is an energy-closed process with a
     low consumption of raw materials and decreased power requirements. The
     resulting MeOH has a high purity. The energy-saving process is suitable
     for prodn. of MeOH from natural gas and
     hydrocarbon-contg. tail gases of industrial processes.

L6   ANSWER 2 OF 5  CAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         2001:115248  CAPLUS
DOCUMENT NUMBER:          134:165467
TITLE:                    Integrated process for converting hydrocarbon gas to
                          liquids
INVENTOR(S):              Gieskes, Thomas
PATENT ASSIGNEE(S):       Atlantic Richfield Company, USA
SOURCE:                   PCT Int. Appl., 38 pp.
```

CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2001010979	A1	20010215	WO 2000-US21352	20000804
W: AE, AU, ID, TT				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
US 6248794	B1	20010619	US 1999-369045	19990805
EP 1204717	A1	20020515	EP 2000-955374	20000804
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				

PRIORITY APPLN. INFO.: US 1999-369045 A 19990805
WO 2000-US21352 W 20000804

AB In a first embodiment, a Fischer-Tropsch (FT) process is integrated with a cryogenic liquefied **natural gas** (LNG) process wherein **tail gas** from (FT) reaction is used to drive a refrigeration compressor in the (LNG) process. The process may be further integrated with a fertilizer prodn. process comprising an ammonia synthesis process and a urea synthesis process. To produce ammonia, hydrogen sepd. from **synthesis gas** produced in a primary and/or secondary reformer in the (FT) process is combined with nitrogen produced in the (LNG) process. Nitrogen may also be supplied to the ammonia synthesis process from an optional air sepn. process, which also provides oxygen enrichment to the thermal reformer in the (FT) process. The produce urea, the ammonia is subsequently reacted with carbon dioxide removed during processing of the gas prior to its liquefaction. In an alternative embodiment, an (FT) process is integrated with a methanol synthesis process wherein tail gas from the (FT) reaction is used to fuel burners in a secondary thermal reformer.

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L6 ANSWER 3 OF 5 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1966:410134 CAPLUS
DOCUMENT NUMBER: 65:10134
ORIGINAL REFERENCE NO.: 65:1822g-h
TITLE: Carbon black feedstock treatment
PATENT ASSIGNEE(S): Continental Carbon Co.
SOURCE: 19 pp.
DOCUMENT TYPE: Patent
LANGUAGE: Unavailable
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
NL 65010951		19660221	NL	

PRIORITY APPLN. INFO.: US 19640820

AB In the manufacture of C black by the furnace process, the liquid hydrocarbon raw material (C-H ratio 0.75 to 1.25; API density <30; av. mol. wt. 140-550; <40% of material coking <290.degree.) is continually stripped by **natural gas, synthesis gas, tail gas** from the furnace process itself, or other gases with a low heat content, the stripping mixt. is fed into the furnace to provide the required heat by combustion, and the stripped liquid hydrocarbon material is fed into the furnace as the feed for C black formation.

L6 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1957:31867 CAPLUS
DOCUMENT NUMBER: 51:31867
ORIGINAL REFERENCE NO.: 51:6124d-e
TITLE: Practical application of the cracking of refinery **tail gases, natural gas**, and propane in gasifiers
AUTHOR(S): Schussl, Franz
SOURCE: Gas, Wasser, Warme (1956), 10, 164-73
DOCUMENT TYPE: Journal
LANGUAGE: Unavailable
AB Detailed fullscale test data on the operation of 4 European water-gas generators (I) are given, in which hydrocarbon gases were cracked: (a) at the Gasworks Naples, Italy, refinery tail gases were cracked in a I gasifying coal to town gas; (b) at the Gasworks Como, Italy, natural gas was cracked in a I gasifying coke to town gas; (c) at the Gasworks Dijon, France, propane was cracked in a I gasifying coal to town gas; and (d) at the Synthesis Works IMAD, Naples, Italy, refinery tail gases were cracked in a I gasifying coke to a **synthesis gas**.

L6 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1952:7044 CAPLUS
DOCUMENT NUMBER: 46:7044
ORIGINAL REFERENCE NO.: 46:1234g-i
TITLE: **Synthesis gases**
INVENTOR(S): Garrison, Allen D.
PATENT ASSIGNEE(S): Texaco Development Corp.
DOCUMENT TYPE: Patent
LANGUAGE: Unavailable
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2566936		19510904	US	

AB A mixt. of H and CO in a ratio of 2:1 is produced from natural gas or CH4 in a 3-stage continuous process employing a highly porous refractory heated to a high temp. In the 1st stage, a mixt. of air, steam, H, and a hydrocarbon or natural gas is allowed to react in the refractory until a temp. of 2000-2200.degree. is reached. In the 2nd stage, CH4 or natural gas compressed to 250 lb./sq. in. is passed at low space velocity through the hot refractory where it is cracked to produce C and H. The C is retained in the pores of the refractory, and with a fall of temp. to approx. 1650-1850.degree., the cracking stage is discontinued. In the 3rd, or generative, stage a mixt. of steam, **natural gas**, and **tail gas** is passed through the refractory. The proportions of CO and H, major products of this reaction, are regulated by varying the gaseous charge mixt. With fall of temp. to approx. 900-1000.degree., the heating stage is resumed. Pulverized coal or liquids, such as kerosene or fuel oil, may be used in place of natural gas. Cf. C.A. 45, 6824i.

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L3: Entry 1 of 1 File: USPT Oct 23, 2001

DOCUMENT-IDENTIFIER: US 6306917 B1
TITLE: Processes for the production of hydrocarbons, power and carbon dioxide from carbon-containing materials

US Patent No. (1):
6306917

Brief Summary Text (23):
Another means for increasing the hydrocarbon yield and carbon conversion efficiency of a system is to recycle part of the tail gas to the inlet of the POX unit. However, the amount of tail gas recycle is limited by the resulting low H.sub.2 :CO ratio in the synthesis gas produced in the POX caused by the large amount of CO.sub.2 in the tail gas.

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NEWS 43	Jun 06	PASCAL enhanced with additional data

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               AND CURRENT DISCOVER FILE IS DATED 01 APRIL 2003
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                                                         ENTRY    SESSION
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FILE LAST UPDATED: 8 Jun 2003  (20030608/ED)

  This file contains CAS Registry Numbers for easy and accurate
  substance identification.


=> s mixing (l) carbon dioxide (l) synthesis gas
        338351 MIXING
          1530 MIXINGS
        339012 MIXING
                 (MIXING OR MIXINGS)
        987633 CARBON
         22118 CARBONS
        995900 CARBON
                 (CARBON OR CARBONS)
        385027 DIOXIDE
          6178 DIOXIDES
```

```
         386599 DIOXIDE
                  (DIOXIDE OR DIOXIDES)
         175679 CARBON DIOXIDE
                  (CARBON(W)DIOXIDE)
        1062756 SYNTHESIS
              3 SYNTHESISES
          59038 SYNTHESES
        1096855 SYNTHESIS
                  (SYNTHESIS OR SYNTHESISES OR SYNTHESES)
        1296255 GAS
         442870 GASES
        1458764 GAS
                  (GAS OR GASES)
          13362 SYNTHESIS GAS
                  (SYNTHESIS(W)GAS)
L1            6 MIXING (L) CARBON DIOXIDE (L) SYNTHESIS GAS

=> d l1 ibib ab 1-6

L1   ANSWER 1 OF 6  CAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         2002:123707  CAPLUS
DOCUMENT NUMBER:          136:297145
TITLE:                    Direct Conversion of Greenhouse Gases to Synthesis Gas
                          and C4 Hydrocarbons over Zeolite HY Promoted by a
                          Dielectric-Barrier Discharge
AUTHOR(S):                Zhang, Kui; Eliasson, Baldur; Kogelschatz, Ulrich
CORPORATE SOURCE:         ABB Corporate Research Ltd., Baden-Dattwil, CH-5405,
                          Switz.
SOURCE:                   Industrial & Engineering Chemistry Research (2002),
                          41(6), 1462-1468
                          CODEN: IECRED; ISSN: 0888-5885
PUBLISHER:                American Chemical Society
DOCUMENT TYPE:            Journal
LANGUAGE:                 English
AB   The direct conversion of methane and carbon dioxide to
     produce C4 hydrocarbons (C4H8, n-C4H10, i-C4H10) and synthesis
     gas (H2 + CO) was investigated over quartz fleece, zeolite NaA,
     zeolite NaY, and zeolite HY catalysts promoted by dielec.-barrier
     discharges (DBDs) at relatively low temps. and ambient pressure.  Both
     pore size and electrostatic properties of zeolites influence the reaction
     under nonequil. plasma conditions.  Zeolite HY is the most promising
     catalyst in producing synthesis gas (H2 + CO) and C4
     hydrocarbons (C4H8, n-C4H10, i-C4H10) with high selectivity at low temps.
     and ambient pressure.  The important variables affecting the activity and
     selectivity of a zeolite HY catalyst in a DBD reactor such as temporal
     stability, discharge power, mixing ratios of methane to
     carbon dioxide, space velocity, operating pressure, and
     wall temp. were studied.  The conversion of methane was 55.1% and that of
     carbon dioxide 26.7%, and the selectivity to CO was
     21.7% and that to C4 hydrocarbons reached 52.1% when the reaction was
     performed at a wall temp. of 423 K, gas pressure of 1 bar, molar ratio of
     methane/carbon dioxide of 3:1, feed gas flow rate of
     200 mL/min, and discharge power of 500 W.
REFERENCE COUNT:          33    THERE ARE 33 CITED REFERENCES AVAILABLE FOR THIS
                                RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1   ANSWER 2 OF 6  CAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         2001:102586  CAPLUS
DOCUMENT NUMBER:          134:210300
TITLE:                    Catalytic partial oxidation of natural gas -
                          operational tests, modeling and prospects
AUTHOR(S):                Dmoch, Marek; Golebiowski, Andrzej; Wrobel, Waldemar;
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Stolecki, Kazimierz
CORPORATE SOURCE: Inst. Nawozow Sztucznych, Pulawy, 24-110, Pol.
SOURCE: Technologia Chemiczna na Przelomie Wiekow (2000), 99-102. Wydawnictwo Stalego Komitetu Kongresow Technologii Chemicznej: Gliwice, Pol.
CODEN: 69AXVP
DOCUMENT TYPE: Conference
LANGUAGE: Polish
AB Catalytic partial oxidn. of natural gas is a combination of a non-catalytic methane oxidn. in the presence of steam or **carbon dioxide** with autothermal steam reforming process on nickel catalyst. Partial oxidn. process is used in hydrogen prodn. plants, in **synthesis gas** prodn. for ammonia synthesis, in methanol and oxo alcs. prodn. plants. Usually partial oxidn. reactions operate at pressure 2.div.4 MPa, H2O/C ratio 1.5.div.2.5 and outlet temp. 950.div.1000.degree.C. The product compn. is close to the equil. compn. The results of thermodn. calcns. showing the influence of operating parameters on the compn. of **synthesis gas** for various present and future applications are presented. Available technol. data on reactors operation, concerning mainly burners, the dimension of combustible chamber, and catalyst bed were collected and analyzed. A math. model and program for calcn. of partial oxidn. reactor were developed on the basis of our own kinetic measurement concerning catalyst deactivation. Calcn. results showing the influence of insufficient gas **mixing** in the combustion chamber on methane conversion are presented. The developed program can be used for designing and reactor optimization and for evaluation of industrial reactor conditions.

L1 ANSWER 3 OF 6 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2001:72674 CAPLUS
DOCUMENT NUMBER: 134:180855
TITLE: Conversion of greenhouse gases to synthesis gas and higher hydrocarbons
AUTHOR(S): Zhang, Kui; Kogelschatz, Ulrich; Eliasson, Baldur
CORPORATE SOURCE: ABB Corporate Research Ltd., Baden-Dattwil, 5405, Switz.
SOURCE: Energy & Fuels (2001), 15(2), 395-402
CODEN: ENFUEM; ISSN: 0887-0624
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The reaction of methane with **carbon dioxide** to produce **synthesis gas** (H2 + CO), gaseous hydrocarbons (C2-C4), and higher hydrocarbons was investigated over quartz fleece, zeolite X, zeolite HY, and zeolite NaY catalysts promoted by dielec.-barrier discharges at low temp. and ambient pressure. Zeolite NaY is the most promising catalyst for producing **synthesis gas** (H2 + CO) and liq. hydrocarbons (C5+) with high methane and **carbon dioxide** conversions. The important variables affecting the activity and selectivity of zeolite NaY catalyst such as discharge power, wall temp., flow rate, **mixing** ratio of methane to **carbon dioxide**, and temporal stability were studied. The conversion of CH4 was 67%, and that of CO2 was 40%. The yield of **synthesis gas** was 47%, and the selectivity to liq. hydrocarbons (C5+) was 34% when the reaction was performed at a wall temp. of 423 K, gas pressure of 1 bar, molar ratio of CH4 to CO2 of 1, feed gas flow rate of 200 mL/min, and input power of 500 W. Zeolite NaY has potential application in the prodn. of **synthesis gas** (H2 + CO) and liq. hydrocarbons (C5+) in a dielec.-barrier discharge reactor at low temp. and ambient pressure.
REFERENCE COUNT: 50 THERE ARE 50 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 4 OF 6 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1999:420437 CAPLUS
DOCUMENT NUMBER: 131:118010
TITLE: Production of synthesis gas through plasma-assisted reforming of greenhouse gases
AUTHOR(S): Kogelschatz, U.; Zhou, L. M.; Xue, B.; Eliasson, B.
CORPORATE SOURCE: ABB Corporate Research Ltd., Baden, 5405, Switz.
SOURCE: Greenhouse Gas Control Technologies, Proceedings of the International Conference on Greenhouse Gas Control Technologies, 4th, Interlaken, Switz., Aug. 30-Sept. 2, 1998 (1999), Meeting Date 1998, 385-390. Editor(s): Eliasson, Baldur; Riemer, Pierce; Wokaun, Alexander. Elsevier: Oxford, UK.
CODEN: 67TZAN
DOCUMENT TYPE: Conference
LANGUAGE: English
AB Low temp. conversion of the two major greenhouse gases CO2 and CH4 to **synthesis gas** (a mixt. of H2 and CO) is investigated theor. and exptl. in a high power dielec.-barrier discharge (DBD). Utilizing this nonequil. discharge technique high conversion rates can be achieved in this special gas mixt. A pronounced synergetic effect caused by free radical reactions was obsd. using these two gases simultaneously. This way CO2 sepd. from flue gases could be combined with methane to produce syngas which then can be processed to yield liq. fuels like e.g. methanol or di-Me ether. Parameters studied are CH4/CO2 **mixing** ratio (0-100% of CO2), elec. power (100-800 W), flow rate (0.1-4 NL/min), gas pressure (0.35-2 bar) and reactor wall temp. (80-250.degree.). This technique of plasma reforming of methane with **carbon dioxide** can produce syngas with different H2/CO ratios depending mainly on the CH4/CO2 **mixing** ratio. The amt. of syngas produced rises almost linearly with increasing discharge power. Up to 66 mol of syngas with a H2/CO ratio of 3.7 were obtained from 100 mol of feed gas in a single pass through the DBD reactor of 31 cm active length. The min. required specific energy was 40 eV/mol. for the prodn. of syngas (H2 plus CO) and the highest energy efficiency (elec. energy converted to chem. energy in the syngas) reached so far was about 7%.
REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L1 ANSWER 5 OF 6 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1995:727426 CAPLUS
DOCUMENT NUMBER: 123:117899
TITLE: Catalytic reduction of carbon dioxide - The effects of catalysts and reductants
AUTHOR(S): Park, S. -E.; Nam, S. S.; Choi, M. J.; Lee, K. W.
CORPORATE SOURCE: Korea Research Institute Chemical Technology, Taejon, 305-606, S. Korea
SOURCE: Energy Conversion and Management (1995), 36(6-9), 573-6
CODEN: ECMADL; ISSN: 0196-8904
PUBLISHER: Elsevier
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Several trials were performed for the catalytic fixation of **carbon dioxide** by using hydrogen as well as methane as reductants in order to convert into useful chems., such as oxygenates and hydrocarbons and **synthesis gas**, resp. As trials for the alleviation of chem. equil. limit in the CO2 hydrogenation into methanol, the hybridized catalysts, such as H-zeolites and K-doped Fe/L zeolite catalysts were prepd. by **mixing** with the methanol catalyst Cu/ZnO/Al2O3. The formation of oxygenated compds. and hydrocarbons, and

of the Me formate were confirmed. Another trial was the Fischer-Tropsch reaction approach to synthesize hydrocarbons directly with CO2/H2 over iron-based bimetallic catalysts. Fe-Co bimetallic catalysts showed over 60% CO2 conversion. **Carbon dioxide** reforming with methane was investigated over pentasil zeolite-supported nickel catalyst, which gave near equil. conversion of CO2 and also near equil. yield on **synthesis gas** with high stability. Pentasil zeolite was superior as support, and alk. promoters also attributed to have high dispersion and stability of nickel species.

L1 ANSWER 6 OF 6 CAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 1995:342201 CAPLUS
DOCUMENT NUMBER: 123:117874
TITLE: Production of synthesis gas by partial oxidation of methane and reforming of methane with carbon dioxide
AUTHOR(S): Uchijima, Toshio; Nakamura, Junji; Sato, Koichi; Aikawa, Keita; Kubushiro, Kaneshige; Kunimori, Kimio
CORPORATE SOURCE: Institute of Materials Science, University of Tsukuba, Tsukuba, 305, Japan
SOURCE: Studies in Surface Science and Catalysis (1994), 81(Natural Gas Conversion II), 325-7
CODEN: SSCTDM; ISSN: 0167-2991
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The prodn. of **synthesis gas** by partial oxidn. of methane and reforming of methane with **carbon dioxide** over supported Rh catalysts have been studied over a range of temps. (550 -1000 K). Effect of support on catalytic activity for partial oxidn. of methane over Rh catalysts was explained by Rh dispersion, where the activities and the dispersions were correlated. On the other hand, for reforming of methane with **carbon dioxide**, metal oxides used for support significantly influenced catalytic activity. Phys. **mixing** of metal oxides such as Al2O3, TiO2, and MgO with Rh/SiO2 caused a marked improvement of the catalytic activity of Rh/SiO2.